

**WHAT IS CLAIMED IS:**

1. An image signal processing apparatus for processing a first image signal including multiple items of pixel data, said first image signal being generated by decoding a motion-compensated predictive encoded-digital image signal, to allow the first image signal to be converted to a second image signal including multiple items of pixel data, said apparatus comprising:

class detection means for detecting a class to which pixel data of a target position in said second image signal belongs, based on at least motion-compensated predictive information which has been used at the time of obtaining the pixel data of said first image signal corresponding to the target position in said second image signal; and

pixel data generation means for generating pixel data of the target position in said second image signal in correspondence with said class detected in said class detection means.

2. The image signal processing apparatus according to Claim 1, wherein said pixel data generation means comprises:

coefficient data generation means for generating coefficient data used in an estimation equation, said coefficient data corresponding to the class detected in said class detection means;

data selection means for selecting multiple items of pixel data located in the vicinity of the target position in said second image signal, based on said first image signal; and

calculation means for calculating and obtaining the pixel data of the target position in said second image signal based on said estimation equation, by use of the

coefficient data generated in said coefficient data generation means and the multiple items of pixel data selected by said data selection means.

3. The image signal processing apparatus according to claim 1, wherein said motion-compensated predictive information includes motion compensation vector information with an accuracy of  $1/2$  pixel, and said class detection means detects a class differing depending on whether or not said motion compensation vector has a  $1/2$  pixel component.

4. An image signal processing method for processing a first image signal including multiple items of pixel data, said first image signal being generated by decoding a motion-compensated predictive encoded-digital image signal, to allow the first image signal to be converted to a second image signal including multiple items of pixel data, said method comprising the steps of:

detecting a class to which pixel data of a target position in the second image signal belongs, based on at least motion-compensated predictive information which has been used at the time of obtaining the pixel data of said first image signal corresponding to the target position in said second image signal; and

generating pixel data of the target position in said second image signal in correspondence with said detected class.

5. A computer-readable medium recording a program of an image signal processing method for processing a first image signal including multiple items of pixel data, said first image signal being generated by decoding a motion-compensated predictive encoded-digital image signal, to allow the first image signal to be converted to

a second image signal including multiple items of pixel data, said method comprising the steps of:

detecting a class to which pixel data of a target position in the second image signal belongs, based on at least motion-compensated predictive information which has been used at the time of obtaining the pixel data of said first image signal corresponding to the target position in said second image signal; and

generating pixel data of the target position in said second image signal in correspondence with said detected class.

6. A program executed by a computer, said program comprising the steps of:

in order to convert a first image signal including multiple items of pixel data, said first image signal being generated by decoding a motion-compensated predictive encoded-digital image signal, to a second image signal including multiple items of pixel data, detecting a class to which pixel data of a target position in the second image signal belongs, based on at least motion-compensated predictive information which has been used at the time of obtaining the pixel data of the first image signal corresponding to the target position in said second image signal; and

generating pixel data of the target position in said second image signal in correspondence with said detected class.

7. An image display apparatus comprising:

image signal input means for inputting a first image signal including multiple items of pixel data, said first image signal being generated by detecting a motion-compensated predictive encoded-digital image signal;

image signal processing means for processing said first image signal thus input by said input means to allow the first image signal to be converted to a second image signal including multiple items of pixel data, and outputting the resultant second image signal; and

image display means for displaying an image produced by said second image signal output by the image signal processing means onto an image display element,

wherein said image signal processing means comprises:

class detection means for detecting a class to which pixel data of a target position in said second image signal belongs, based on at least motion-compensated predictive information which has been used at the time of obtaining the pixel data of said first image signal corresponding to the target position in said second image signal; and

pixel data generation means for generating the pixel data of the target position in said second image signal in correspondence with the class detected in said class detection means.

8. An apparatus for generating coefficient data of an estimation equation to be used at the time of converting a first image signal including multiple items of pixel data, said first image signal being generated by decoding a motion-compensated predictive encoded-digital image signal, to a second image signal including multiple items of pixel data, said apparatus comprising:

decoding means for decoding digital image signal obtained as a result of encoding a teacher signal corresponding to said second image signal and obtaining a student signal corresponding to said first image signal;

class detection means for detecting a class to which pixel data of a target position in said teacher signal belongs, based on at least the motion-compensated

predictive information which has been used at the time of obtaining the pixel data of said student signal corresponding to the target position in said teacher signal;

data selection means for selecting multiple items of pixel data located in the vicinity of the target position in said teacher signal, based on the student signal output from said decoding means; and

calculation means for performing a calculation using the class detected in said class detection means, the multiple items of pixel data selected by said data selection means, and the pixel data of the target position in said teacher signal, and obtaining the coefficient data for each class.

9. The apparatus according to claim 8, wherein said motion-compensated predictive information includes motion compensation vector information with an accuracy of  $1/2$  pixel, and said class detection means detects a class differing depending on whether or not the motion compensation vector has a  $1/2$  pixel component.

10. A method for generating coefficient data of an estimation equation to be used at the time of converting a first image signal including multiple items of pixel data, said first image signal being generated by decoding a motion-compensated predictive encoded-digital image signal to a second image signal including multiple items of pixel data, said method comprising:

a first step for decoding digital image signal obtained as a result of encoding a teacher signal corresponding to said second image signal and obtaining a student signal corresponding to said first image signal;

a second step for detecting a class to which pixel data of a target position in said teacher signal belongs, based on at least motion-compensated predictive information

which has been used at the time of obtaining the pixel data of said student signal corresponding to the target position in said teacher signal;

a third step for selecting multiple items of pixel data located in the vicinity of the target position in said teacher signal, based on the student signal obtained in said first step; and

a fourth step for obtaining said coefficient data for said each class, by use of the class detected in said second step, the multiple items of pixel data selected in said third step, and the pixel data of the target position in said teacher signal.

11. A computer-readable medium recording a program of a method for generating coefficient data of an estimation equation to be used at the time of converting a first image signal including multiple items of pixel data, said first image signal being generated by decoding a motion-compensated predictive encoded-digital image signal, to a second image signal including multiple items of pixel data, said method comprising:

a first step for decoding digital image signal obtained as a result of encoding a teacher signal corresponding to said second signal and obtaining a student signal corresponding to said first image signal;

a second step for detecting a class to which pixel data of a target position in said teacher signal belongs, based on at least motion-compensated predictive information which has been used at the time of obtaining the pixel data of said student signal corresponding to the target position in said teacher signal;

a third step for selecting multiple items of pixel data located in the vicinity of the target position in said teacher signal, based on the student signal obtained in said first step; and

a fourth step for obtaining said coefficient data for said each class, by use of the class detected in said second step, the multiple items of pixel data selected in said third step, and the pixel data of the target position in said teacher signal.

12. A program executed by a computer, said program comprising:

in order to generate coefficient data of an estimation equation to be used at the time of converting a first image signal including multiple items of pixel data, said first image signal being generated by decoding a motion-compensated predictive encoded-digital image signal, to a second image signal including multiple items of pixel data, a first step for decoding digital image signal obtained as a result of encoding a teacher signal corresponding to said second signal and obtaining a student signal corresponding to said first image signal;

a second step for detecting a class to which pixel data of a target position in said teacher signal belongs, based on at least motion-compensated predictive information which has been used at the time of obtaining the pixel data of said student signal corresponding to the target position in said teacher signal;

a third step for selecting multiple items of pixel data located in the vicinity of the target position in said teacher signal, based on the student signal obtained in said first step; and

a fourth step for obtaining said coefficient data for each class, by use of the class detected in said second step, the multiple items of pixel data selected in said third step, and the pixel data of the target position in said teacher signal.